

Claims:

1. An optical communication switch comprising at least a first and a second interfaces each adapted to be connected to at least one segment of a first optical path and a segment of a second optical path,
 - wherein said first interface is adapted to:
 - receive a first part of communication carried along a first segment of said first optical path;
 - convey a second part of the communication towards said first segment of said first optical path;
 - receive a second part of communication carried along said first segment of said second optical path; and
 - convey a first part of communication towards said first segment of said second optical path;
 - wherein said second interface is adapted to:
 - convey a first part of communication towards a second segment of said first optical path;
 - receive a second part of the communication carried along said second segment of said first optical path;
 - convey a second part of communication towards said second segment of said second optical path; and
 - receive a first part of communication carried along said second segment of said second optical path,
 - wherein under normal operating conditions said optical communication switch is adapted to:
 - receive the first part of communication carried along said first segment of said first optical path at said first interface, and convey it towards said second segment of said first optical path;
 - receive a second part of the communication carried along said second segment of said first optical path at said second interface, and convey it towards said first segment of said first optical path;

receive the second part of communication carried along said first segment of said second optical path at said first interface, and convey it towards said second segment of said second optical path;

receive a first part of the communication carried along said second segment of said second optical path at said second interface, and convey it towards said first segment of said second optical path;

and wherein in response to a fault detected along the second segment of the first optical path, said optical communication switch is adapted to:

divert the first part of communication received from said first segment of said first optical path at said first interface, and convey it via said second interface towards said second segment of said second optical path; and

divert the first part of communication received from said second segment of said second optical path at said second interface, and convey it via said first interface towards said first segment of said first optical path.

2. An optical communication system comprising a first optical communication switch of the present invention connected to a second optical communication switch of the present invention via at least a first and a second optical paths extending between said first and second optical communication switches,

wherein the first optical path is adapted to carry a first part of communication from the first optical communication switch to the second optical communication switch and a second part of the communication from the second optical communication switch to the first optical communication switch;

wherein the second optical path is adapted to carry a first part of communication carried from the second optical communication switch to the first optical communication switch and a second part of the communication from the first optical communication switch to the second optical communication switch;

wherein a bandwidth allocated for carrying the second part of communication along the second optical path is equal or greater than the bandwidth allocated for carrying the first part of communication along the first optical path and a bandwidth allocated to carrying the first part of communication along the second optical path is equal or greater than the bandwidth allocated to carrying the second part of communication along the first optical path; and

wherein in a normal type of operation, communication is carried along the first optical path and in response to a fault detected along the first optical path, communication is diverted to the second optical path so that the first part of communication is diverted from the first optical path to be carried as the second part of communication along the second optical path, and the second part of communication is diverted from the first optical path to be carried as the first part of communication along the second optical path.

3. A system according to claim 2, adapted to be installed in a ring type configuration.
4. A system according to claim 2, adapted to be installed in a mesh type configuration.
5. A system according to claim 2, further comprising a first communication network device installed in said first

optical path extending between said first optical communication switch and said second optical communication switch, and a second communication network device operative to provide essentially the same outcome as that derived from said first communication network device's operation, and is installed in said second optical path extending between said first optical communication switch and said second optical communication switch.

6. A system according to claim 5, wherein said first communication network device is a member selected from the group comprising of in-line amplifier, Optical Add and Drop Multiplexer, and WDM multiplexer/de-multiplexer.
7. In a network comprising a first optical communication switch connected to at least a first and a second segments of a first optical path and connected to at least a first and a second segments of a second optical path, and a second optical communication switch connected to at least said second and a third segments of said first optical path and connected to at least said second and a third segments of a second optical path, a method of carrying out protection comprising the steps of:
 - detecting the occurrence of fault at said second segment of said first optical path;
 - diverting communication carried along said first segment of said first optical path to said second segment of said second optical path;
 - diverting communication carried along said second segment of said second optical path to said first segment of said first optical path;

diverting communication carried along said second segment of said second optical path to said third segment of said first optical path; and

diverting communication carried along said third segment of said first optical path to said second segment of said second optical path,

thereby bypassing said second segment of the first path.

8. A method according to claim 7, wherein the detecting step is based on at least one event that is a member of the group comprising: loss of optical signal at a main path, lowered Optical Signal to Noise Ratio (OSNR) under a predefined threshold value, and exceeding a pre-defined threshold level of degradation in quality of the digital signals conveyed.